G. H. GILMAN.
LUBRICATOR.
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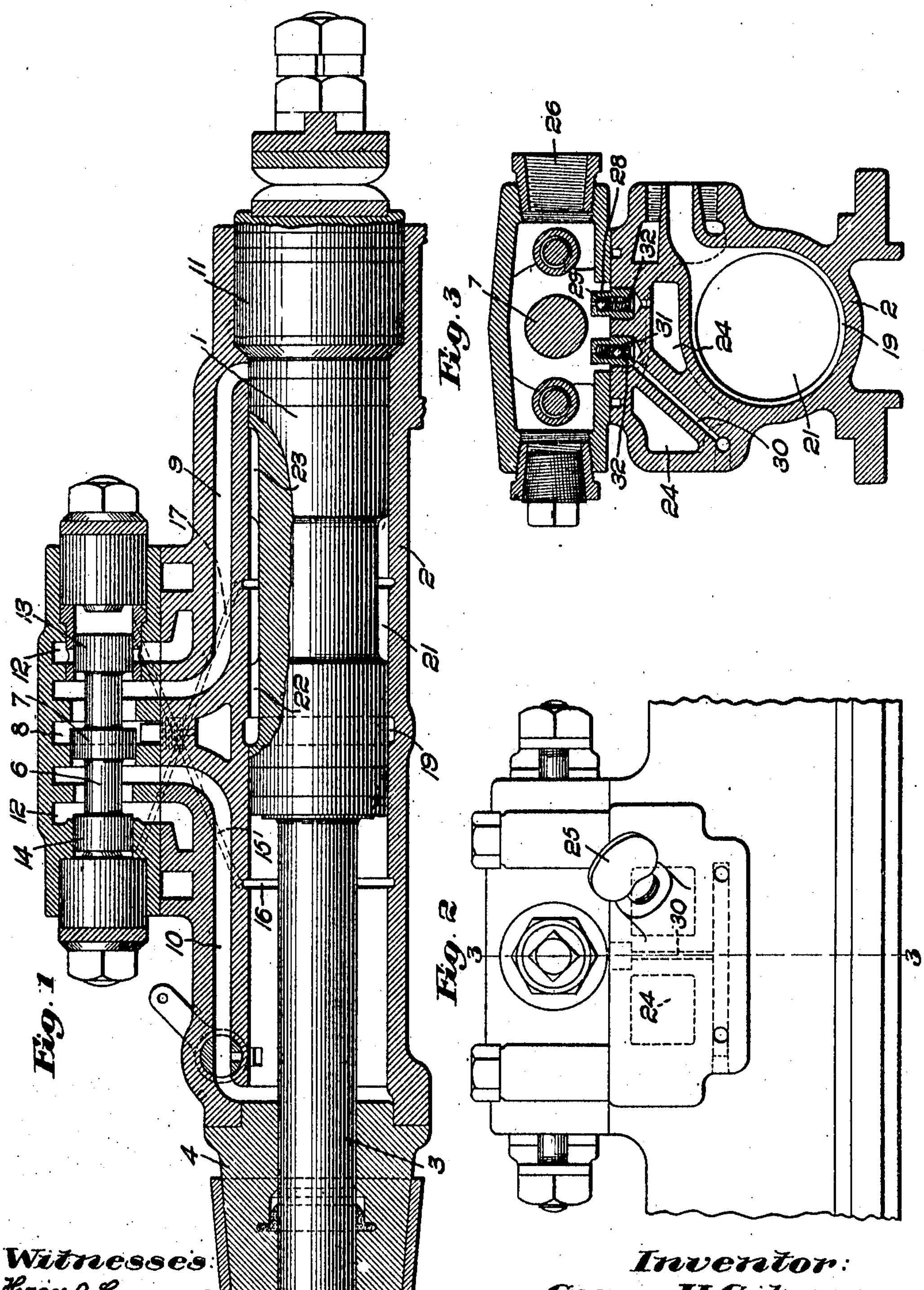
**1,035,117.** Patented Aug. 6, 1912.

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# UNITED STATES PATENT OFFICE.

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## LUBRICATOR

**1,035,117.** Specification of Letters Patent. **Patented Aug. 6, 1912.**

Original application filed January 3, 1911, Serial No. 600,403. Divided and this application filed June 20, 1911. Serial No. 634,282.

*To all whom it may concern:*

Be it known that I, GEORGE H. GILMAN, a citizen of the United States, and a resident of Claremont, county of Sullivan, State of New Hampshire, (whose post-office address is Claremont, New Hampshire,) have invented an Improvement in Lubricators, of which the following description, in connection with the accompanying drawings, is a specification, like characters on the drawings representing like parts.

This invention relates to engines and more particularly, though not exclusively, to engines of the direct-acting type such as are used in connection with rock drills and other stone working machines, being more particularly concerned with improvements in the controlling valves and lubricating means for such engines.

This application is a division of my prior copending application Serial No. 600,403, filed January 3, 1911.

My invention will be best understood by reference to the following description when taken in connection with the accompanying illustration of one specific embodiment thereof, while its scope will be more particularly pointed out in the appended claims.

In the drawings: Figure 1 is a sectional elevation taken through the cylinder and valve chamber of a rock drill embodying one form of my invention. Fig. 2 is a side elevation of the cylinder and valve chamber; and Fig. 3 is a transverse sectional elevation on the line 3—3 in Fig. 2.

Referring to the drawings and more particularly to Fig. 1, I have there shown for the purpose of illustrating the invention, the piston 1 and cylinder 2 of a rock drill. The piston rod 3 which projects through the forward cylinder head 4 is shown broken away, but these parts as well as the cutting tool to which the forward end of the piston rod is attached, the tool holding chuck and other usual constructional features of a rock drill may be of any well known construction and do not materially concern the hereindescribed invention. Referring more particularly to the controlling valve 6 the latter is of the pressure-actuated piston type having a central head or spool 7 which alternately connects the supply chamber 8 with the ports 9 and 10, the former leading to the rear or head end of the cylinder immediately in front of the rear head or buffer 11, and the latter to the forward or tool end of the cylinder immediately behind the front cylinder head 4. The engine may be used with steam, air, or other pressure fluid. In the position of the valve shown, the pressure fluid passes from the supply chamber 8 through the port 9 to the head end of the cylinder, acting to drive the piston forward, the port 10 being at the same time connected about the contracted or stem portion of the valve, with one end of the exhaust space 12. When the valve is reversed, the port 10 is connected with the supply chamber 8 and the head end port 9 with the opposite end of the exhaust space 12. To reverse the valve the latter is provided at opposite ends with the spools 13 and 14 which work in end chambers to which pressure is alternately admitted by the movement of the piston to throw the valve. The chamber containing the head 13 is connected by a passage 15 (see dotted lines) leading to the groove 16 in the walls of the cylinder, and the chamber containing the head 14 is connected by means of the passage 17 (see dotted lines) with the groove 18 in the cylinder walls. These grooves are alternately uncovered by the reciprocatory movement of the piston, the uncovering of a groove serving to admit pressure to that end of the valve chamber with which the said groove is connected, such admission of pressure fluid reversing the position of the valve. The fluid pressure is exhausted from that end of the valve chamber opposite the end to which pressure is admitted by means of a circumferential groove 19 in the walls of the cylinder midway the length thereof, such groove (see Fig. 3) having connection with the external atmosphere through the exhaust pipe or opening 20. The circumferential groove 19 communicates with a groove or reduced portion 21 in the walls of the piston by means of longitudinal grooves 22 and 23, so that one end or the other of the valve chamber is kept free from pressure fluid during substantially the full stroke of the piston. The spool 7 is of greater diameter than the spools 13 and 14 so that when the valve is thrown to one position or the other, for example the position shown in Fig. 1, it is there maintained by the excess pressure of the supply fluid against the central head over the pressure of the supply fluid against the smaller end head until the pressure fluid is admitted, as described, against the opposite end of the valve. This particular form of valve and the arrangement of controlling passages may be varied within wide limits, or other forms of valves may be substituted without departing from the spirit of my invention hereinafter more fully described.

In connection with the described form of tool I have also provided means for lubricating the engine through a supply of lubricant delivered to the pressure supply space in the valve chamber by means of the variations in pressure thereat. Referring to Figs. 2 and 3, in the walls of the cylinder between the cylinder and the valve casing there is provided a chamber 24 for the reception of a supply of lubricant. The latter may be introduced into the chamber through a lateral orifice normally closed by the threaded plug 25 (Fig. 2). The pressure in the supply space 8, which latter is connected with the suitable source of pressure fluid supply through the lateral opening 26, is not constant but is subject to periodic variations. When the valve is thrown and about its mid position, both the ports 9 and 10 are cut off from the supply space and the pressure therein undergoes a sudden rise or upward fluctuation. When however the valve has passed this point and reached the end of its stroke with one or the other port fully opened, the inrush of pressure fluid thereto causes a sudden drop or downward fluctuation in pressure.

When the upward pressure fluctuation occurs, pressure fluid is permitted to pass from the supply space to the oil reservoir through the orifice 27 contained in the plug 28 threaded into the walls of the cylinder. The plug contains a ball or other check valve 29 opening downwardly or away from the opening so that when the pressure of the supply space exceeds that of the reservoir the fluid pressure passes from the former to the latter. This raises, or builds up in the reservoir a pressure which may be substantially constant and uniform, or may fluctuate somewhat, according to the circumstances. This pressure acts to force lubricant from the lubricant reservoir through the feed passage to the pressure supply space. From the lower end of the reservoir there is provided a duct or passage 30 leading back to the supply space but controlled at its entrance thereto by means of a second check valve 31 adapted to open and allow the exit of lubricant into the supply space only when the pressure of the reservoir exceeds that the supply space. This, however, occurs when the controlling valve 6 reaches the end of its stroke and at that instant the check valve yields and a quantity of oil is forced into the supply space by the superior pressure of the reservoir. On the next stroke of the valve upward pulsation of pressure in the supply space admits an additional supply of pressure fluid to the reservoir and this in turn forces an additional amount of lubricant to the supply space when the pressure of the valve chamber drops. This action being repeated with each stroke of the valve, an intermittent supply of lubricant is maintained for the valve chamber which is carried over into the engine cylinder with the pressure fluid admitted thereto. The quantity of oil fed may be regulated by altering the tension on the check valve springs, such tension being herein adjustable by means of the threaded screws 32.

While I have herein shown and described for purposes of illustration one specific form of the invention, it is to be understood that the same is not limited to the details of construction or relative arrangement of parts, but that extensive deviations may be made therefrom without departing from the spirit thereof.

Claims.

1. In a pressure-fluid engine the combination with a piston and cylinder of a pressure-actuated controlling valve having a valve chamber and pressure supply space, a lubricant reservoir having a pair of passages communicating with said pressure supply space, an inwardly opening check valve in one passage and an outwardly opening check valve in the other passage.

2. A pressure-fluid engine having a piston and cylinder, a valve chamber with pressure supply space located on one side of said cylinder, a lubricant reservoir between said pressure supply space and engine cylinder, a passage leading from the pressure supply space to the outer wall of said lubricant reservoir, a check valve controlling said passage and opening toward the lubricant reservoir, a second passage extending from the inner wall of said lubricant reservoir to such pressure supply space, and a check valve controlling said second passage and opening from said reservoir toward said pressure supply space.

3. In a pressure-fluid engine, the combination with a valve having a pressure supply space and having also a lubricant reservoir provided with a feed passage leading to the pressure supply space, of means for utilizing the pulsations of pressure in the pressure supply space to force lubricant from the lubricant reservoir through said feed passage to the pressure supply space.

4. In a pressure-fluid engine, the combination with a piston and cylinder, the latter having a pressure supply space, of a valve

controlling communication between the cylinder and the pressure supply space, said engine having a lubricant reservoir and a feed passage to feed lubricant from the reservoir to the pressure supply space, and means to communicate the pressure in the pressure supply space to the lubricant reservoir to feed lubricant from the lubricant reservoir through the said feed passage.

5. In a pressure-fluid engine, the combination with a piston and cylinder, the latter having a pressure supply space, of a valve controlling communication between the pressure supply space and the cylinder, said engine having a lubricant reservoir, the latter having a pressure passage and a feed passage communicating with the pressure supply space, said pressure passage communicating pulsations of pressure to the reservoir to cause the feed of lubricant from the reservoir to the pressure supply space through the feed passage.

6. In a pressure-fluid engine, the combination with a piston and cylinder, the latter having a pressure supply space, of a valve controlling communication between the pressure supply space and the cylinder, said engine having also a lubricant reservoir, the latter provided with a pressure passage, and a lubricant feed passage communicating with the pressure supply space, and a check valve in the pressure supply space permitting the passage of pressure fluid to the reservoir under the pulsations of pressure in the pressure-fluid supply space, thereby to cause the feed of lubricant through the said feed passage.

In testimony whereof, I have signed my name to this specification, in the presence of two subscribing witnesses.

GEORGE H. GILMAN.

Witnesses:

CHAS. J. JONES.

E. J. BURCHARD.